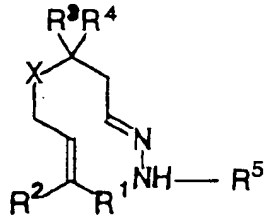
Claims

1. A process for an asymmetric intramolecular [3+2] cycloaddition reaction of a hydrazone characterized by reacting a hydrazone derivative represented by the following formula (III):

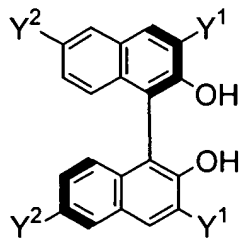


(Ⅲ)

(wherein R^1, R^2, R^3, R^4 and R^5 are each identical or different and denote a hydrogen atom or a hydrocarbon group which may have a substituent or a hetero atom, R^1 and R^2, R^3 and R^4 may be linked to form a ring by a hydrocarbon chain which may have a substituent or a hydrocarbon chain which has a hetero atom, and X denotes a hetero atom or a hydrocarbon chain which may have a substituent or a hetero atom) in the presence of an asymmetric catalyst system obtained by mixing a zirconium alkoxide represented by the following formula (I):

$$Zr(OR)_4 \qquad (I)$$

(wherein R is a hydrocarbon group which may have a substituent) with a binaphthol derivative represented by the following formula (II):



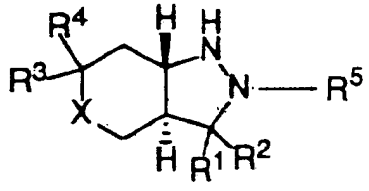
(Ⅱ)

(wherein Y^1 and Y^2 are each identical or different and denote a hydrogen atom or a halogen atom, and at least one of Y^1 and Y^2 denotes a halogen atom).

2. The process for an asymmetric intramolecular [3+2] cycloaddition reaction according to claim 1, which is carried out in the coexistence of a primary alcohol.

3. The process for an asymmetric intramolecular [3+2] cycloaddition reaction according to claim 2, wherein the primary alcohol is an n-propanol.

4. The process for an asymmetric intramolecular [3+2] cycloaddition reaction according to any one of claims 1 to 3, by which an asymmetric cyclic compound represented by the following formula (IV):



(IV)

is synthesized.

5. The process for an asymmetric intramolecular [3+2] cycloaddition reaction according to any one of claims 1 to 4, wherein the zirconium alkoxide used in the catalyst system is $Zr(O^tBu)_4$ or $Zr(OPr)_4$.